

CLAIMS

1. A stretch rod extending device for a stretch blow molding machine, wherein said stretch blow molding machine  
5 comprises:

a blow mold being openable and closable;

a neck mold holding a preform and closing with said blow mold;

10 a core supporting plate holding a blow core member which fits with said neck mold; and

a rod fixing plate holding a stretch rod inserted into said preform through said blow core member;

15 wherein said neck mold, said core supporting plate, and said rod fixing plate are movable up and down together or separately, and said rod fixing plate is connected to a stretch rod extending device, and said stretch rod extending device comprises a nut member and a screw shaft which converts the rotation of a electrical servo motor to linear movement, and

20 wherein the nut member and the screw shaft comprise a magnetic nut member and a magnetic screw shaft having spiral N magnetic pole and S magnetic pole alternately provided on inner peripheral surface of a cylindrical permanent magnetic member and outer peripheral surface of a permanent magnetic 25 shaft at the same pitch, and said magnetic screw shaft is inserted into a cylindrical plunger having said magnetic nut member equipped inside by keeping required clearance between said magnetic screw shaft and said magnetic nut member so as to match the same magnetic poles.

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2. The stretch rod extending device for a stretch blow molding device according to claim 1, wherein said stretch rod extending device comprises;

a cylinder having the front end being opened and the rear

end being closed;

    said cylindrical plunger being inserted into said cylinder and movable in and out from the front end of said cylinder;

5      said magnetic nut member being fitted inside said plunger;

    said magnetic screw shaft being stably inserted from a bearing member fixed on the rear end of said cylinder, into said plunger through said magnetic nut member by keeping  
10 required clearance between said magnetic screw shaft and said magnetic nut member so as to match the same magnetic poles; and

15      said electrical servo motor being connected to said magnetic screw shaft and rotates said magnetic screw shaft forward or reverse.

3.      The stretch rod extending device for a stretch blow molding device according to claim 1 or claim 2, wherein the required clearance between said magnetic nut member and said  
20 magnetic screw shaft is maintained by a front shaft of said magnetic screw shaft, a bearing, installed between said front shaft and said plunger, and said bearing member.

4.      The stretch rod extending device for a stretch blow molding device according to claim 1 or claim 2, wherein said extending device is installed on said stretch blow molding device by mounting said cylinder vertically with keeping said electrical servo motor up on a mounting base, which is connected to said core supporting plate and set above said rod fixing plate, and said plunger is connected to said rod fixing plate.

5.      The stretch rod extending device for a stretch blow molding device according to any one of claim 1 to claim 4,

wherein said rod fixing plate is movable up and down between said mounting base which is connected to a piston rod of a lifting cylinder mounted on the upper portion of said stretch blow molding device and is installed above said rod fixing plate, and said core supporting plate below with being guided by a tie rod connecting said mounting base and said core supporting plate, and said rod fixing plate moves up and down with said core supporting plate by said lifting cylinder via said extending device connected to both said mounting base and 10 said core supporting plate.

6. A bottom mold lifting device for a stretch blow molding machine, wherein said stretch molding machine comprises;

15        a blow mold being openable and closable;

          a neck mold holding a preform and closing with said blow mold;

          a stretch rod being inserted into said preform through said blow core member, which fits into said neck mold; and wherein

20        a lifting device for a bottom mold of said blow mold comprises a nut member and a screw shaft which converts the rotation of a electrical servo motor to linear movement, and wherein

          the nut member and the screw shaft comprise a magnetic 25        nut member and a magnetic screw shaft having spiral N magnetic pole and S magnetic pole alternately provided on inner peripheral surface of a cylindrical permanent magnetic member and outer peripheral surface of a permanent magnetic shaft at the same pitch, and said magnetic screw shaft is inserted into a cylindrical plunger having said magnetic nut member equipped inside by keeping required clearance between said magnetic screw shaft and said magnetic nut member so as to match the same magnetic poles.

7. The bottom mold lifting device for the stretch blow molding machine according to claim 6, wherein said bottom mold lifting device comprises;

5 a cylinder, of which the front end is opened and the rear end is closed;

a spline bush, which fits in the front end of the cylinder;

10 the plunger having a splined portion formed on the outer peripheral surface and engaging with said spline bush, and being movable in and out from the front end of said cylinder;

15 the magnetic screw shaft being stably inserted from a bearing member fixed on the rear end of said cylinder, into said plunger through said magnetic nut member by keeping required clearance between said magnetic screw shaft and said magnetic nut member so as to match the same magnetic poles; and

20 said electrical servo motor is connected to a rear shaft and rotates said magnetic screw shaft forward or reverse, and wherein

25 said cylinder is mounted vertically on the lower surface of said base under said blow mold with keeping said electrical servo motor down, and the plunger is connected to said bottom mold through the opening of said base.

8. The bottom mold lifting device for the stretch blow molding machine according to claim 6 or claim 7, wherein a front shaft of said magnetic screw shaft is movable in a concavity of said bottom mold, and the required clearance 30 between said magnetic nut member and said magnetic screw shaft is maintained by said bearing member and a bearing installed between said front shaft and said plunger.